Faculty of Cognitive Sciences and Human Development

ANXIETY AND WORKING MEMORY PERFORMANCE

AMONG UNIMAS STUDENTS

Ulfah Binti Faisal

Bachelor of Psychology (Honours)

2022

UNIVERSITI MALAYSIA SAWARAK

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Masters ☐
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ANXIETY AND WORKING MEMORY PERFORMANCE AMONG UNIMAS STUDENTS

ULFAH BINTI FAISAL

This project is submitted
in partial fulfilment of the requirements for a
Bachelor of Psychology with Honours

Faculty of Cognitive Sciences and Human Development
UNIVERSITI MALAYSIA SARAWAK
(2022)

The project entitled **'[Anxiety and Working Memory Performance among UNIMAS Students]'** was prepared by **[Ulfah Binti Faisal, 72718]** and submitted to the Faculty of Cognitive Sciences and Human Development in partial fulfillment of the requirements for a Bachelor of Psychology with Honours

Received for examination by:

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_ _ _ _ _ _ 22/7/2022

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Abstract

The purpose of this quasi-experimental study is to investigate the relationship between anxiety and verbal working memory as well as the visuospatial working memory of students at the University Malaysia Sarawak. The working memory is measured based on total correct recall and the total time taken for participants to recall their memory. 32 undergraduate students participated in the study where they were asked to answer the State-Trait Anxiety Inventory-6, they also completed the operation span task to test verbal working memory and the rotation span task to test visuospatial working memory. The hypothesis of the study was measured using Pearson correlation analysis. The result revealed there is no significant relationship between anxiety and verbal working memory and visuospatial working memory in terms of total correct recall. In addition, the findings show there is no significant relationship between anxiety and verbal working memory and visuospatial working memory in terms of the total time taken. These findings are inconsistent with prior research studies. The current study discusses the limitations, implications, and recommendations for the reference to future researchers.

Keywords: anxiety, verbal working memory, visuospatial working memory,

<center>**Chapter 1**</center>

<center>**Introduction**</center>

1.0 Introduction

The first chapter of this study discusses the background of the study, the research objectives that include general and specific objectives, research questions, research hypothesis, conceptual framework, the significance of study, definition of terms, and finally the summary of the chapter.

1.1 Background of Study

Anxiety is the most common reason students seek mental health services, according to the Penn State University's Center for Collegiate Mental Health 2017 Annual report. Anxiety symptoms include anxiousness, discomfort, a sense of imminent danger or disaster, sweating and shaking, difficulty to focus, excessive worry, and insomnia (American Psychological Association, 2013). According to the National Institute of Mental Health (NIMH) (2018), generalized anxiety disorder is characterized by a feeling of restlessness, weariness, and difficulty concentrating on any tasks. Just like other mental health issues, anxiety is quite difficult for clinicians to diagnose and for patients to recognize. People who suffer from chronic anxiety frequently avoid environments and events that may elicit these feelings, which will severely impact their life quality (Muzina & El-Sayegh, 2001). They may be unaware of how anxiety can affect their working memory skills and just frequently downplay the effect of anxiety on their daily lives. The Center for Collegiate Mental Health (CCMH) Annual Report in 2019 summarizes a study from the Penn State University, which gathered data from over 100,000 young people evaluated at student health centers around the country, discovered that 61% of them reported anxiousness as one of their main health problems.

<center>7</center>

Students are easily exposed to anxiety due to numerous reasons; for instance, they begin to think with the stress of deciding a new career based on their educational course and goals. Collins (2018) stated that college students may have greater vulnerability to anxiety because mental illness frequently arises during the transition from childhood to adulthood. Moreover, Platt, Williams, & Ginsburg (2016) stated that relationship issues, family problems, stress, adjusting to a new environment, and self-esteem issues are all contributors to anxiety. According to published studies, more than 20% of people have met the criteria for anxiety disorder by the age of 26, and having anxiety disorder during childhood or adolescence predicts deficiencies in young adulthood in terms of financial, physical, and interpersonal functioning (Copeland, Shanahan, Costello, & Angold, 2009). Students' level of anxiety can be exacerbated by the daily strains and expectations of academic performance (The American Institute of Stress, 2019). This is the time of their lives when they are through a huge life transition and adjustment.

According to research conducted in Malaysia, the overall prevalence among students was slightly higher than in previous Malaysian studies, which reported rates of 63% and 60% respectively (Radeef & Faisal, 2016). The result of the study shows the overall prevalence of anxiety among undergraduate medical students from the faculty of medicine, International Islamic University Malaysia (IIUM) was 65.8%. When the various variables were compared, it was discovered that being female, younger than 21 years old, away from family and the year of study were all significant factors for anxiety. In addition, Radeef, Faisal, Ali, & Ismail (2014) stated that the three stressors: examination and grades, feelings of incompetence, and lack of motivation to learn were significantly related to a higher score of anxiety.

A cross-sectional study among 397 undergraduate students in Melaka Manipal Medical College showed that 8.6% to 30.5% of students have mild to extremely severe anxiety. In the current study, the result indicates prevalence for moderate to extremely severe anxiety is 55.5% respectively (Teh et al., 2015). The study participated by undergraduate students in Melaka

Manipal Medical College reported that only ethnicity has been shown to be a significant predictor of anxiety. Malay ethnicity has been linked to an increased risk of developing anxiety.

This may be due to cultural differences that make Malays more vulnerable to stress and anxiety. Another study of anxiety among Malaysian students shows that anxiety was found to be prevalent in 29% of 1821 students that participate in the study. The data shows that the year of study, financial support, alcohol assumption, sleeplessness, body mass index, supportive friends, having doubts about the future, actively engaged in society were all significantly related to the higher level of anxiety (Mohamad et al., 2021).

Grillon (2002) stated that anxiety is a condition of heightened alertness accompanied by an increased total sensory sensitivity as a result of uncertainty and conflict. Matthews and Wells (1966) highlighted that anxiety is characterized by a lack of control over anxious thoughts as well as attentional biases, which play a role in a greater focus on unpleasant stimuli. Moran (2016) reported that anxiety has been proven to impair cognitive function especially working memory. This was proven by an experimental study conducted by Lukasik, Waris, Soveri, Lehronen, and Laine (2019) where participants who obtained higher State-Trait Anxiety Inventory (STAI-6) scores performed badly on the working memory tests. This relationship between anxiety and working memory is reciprocal, as cognitive decline can result in higher anxiety (Petkus et al., 2017).

This research study is important as it will give more understanding of the effect of anxiety and help students to become aware of the consequences to their working memory performance and find solutions to reduce anxiety in their daily lives. In this era of technological advancement, the level of anxiety among university students is higher than in the previous century (Alhumaid, 2019). The exposure of social media, where we compare ourselves and our lives with others, can create a high level of anxiety where people start to become concerned that their life is not the best or that their lives are plain boring compared to the lives of others seen in social media. Therefore,

this experimental study is proposed to investigate the relationship between anxiety and working memory performance in terms of verbal and visuospatial cognitive processes.

1.2 Problem Statement

Anxiety issue is a significant global health burden with profound social and economic consequences that impacted especially young adults like university students. Anxiety is reported to be the big driver of disability worldwide in 20 to 29 years old (Osman et al., 2012 as cited in Mental Health Foundation). In Malaysia, there were 95% of patients aged 17 years old and above sought treatment for this emotional disorder. The symptoms are varied, ranging from hyperarousal to difficulty focusing and a broader category of altered cognitive performance which is the main topic of this study. It is well-known from prior studies that a high level of anxiety can disrupt one working memory performance. To minimize the risk of having low working performance, it is also important to understand the relationship between anxiety and working memory and how it could affect our lives. In order to have excellent working memory skills, one must first develop a normal and stable level of anxiety within themselves.

There is a growing number of studies conducted regarding the relationship between anxiety and working memory performance (Lukasik et al., 2019). However, after reviewing past studies, there is very little discussion that touched on the relationship between anxiety and verbal working memory and visuospatial working memory. Most of the previous studies investigate the impact of anxiety on cognition in terms of attention/control, sensory-perceptual processes, and executive function (Robinson et al., 2013). Many types of research also focus on the relationship between anxiety and verbal working memory and visuospatial working memory among adults but not among university students. For instance, a study conducted by Lukasik et al., (2019) examined how anxiety affected working memory performance in nondepressed adult samples. They

discovered that anxiety, both as a state and as a trait is related with poorer working memory performance across task concepts and contents. Anxiety was found to be negatively correlated with both verbal and visuospatial working memory capacity.

The methodological gap also exists between the past studies and this research topic of interest as there are differences in targeted participants for the relationship between anxiety and working memory performance. A study was done by Lukasik et al. (2019) focused on the nondepressed United States American adult rather than on university students. However, a study by Peters (2015) shows a high similarity to this research as it is focusing on university students from Western Carolina University. The research paper focuses on verbal working memory but does not indicate the correlation between anxiety and visuospatial working memory. A research paper done by Lee (1999) is similar to this ongoing study by focusing on the university students enrolled in educational psychology at the University of Iowa. The study focused on the effect of test anxiety on working memory performance. The result shows that test anxiety indeed affected performance on the verbal-analogies task but not the visuospatial task. Nearly all of these studies are conducted using the experimental research method by disseminating State-Trait Anxiety Inventory (STAI) questionnaires to measure participants' anxiety and participants are required to complete working memory tasks such as verbal tasks and visuospatial tasks.

In terms of the practical gap, these types of studies mentioned above have been conducted outside Malaysia. Hence, the awareness of anxiety and its relationship with working memory is still poorly understood and not widespread among Malaysians. When it comes to the mental health-anxiety relationship correlation, they seem to focus on the relationship of anxiety with behaviour and achievement, but not the correlation of anxiety with cognition. Hence, this research aims to investigate the relationship between anxiety and verbal and visuospatial working memory performance among university students.

1.3 Research Objectives

1.3.1 General Objectives

The general objective of this research study is to identify the relationship between anxiety and both verbal working memory and visuospatial working memory performance among university students.

1.3.2 Specific Objectives

The specific objectives of this study:

1. To identify the relationship between anxiety and verbal working memory performance among university students based on the total number of correct recalled.

2. To identify the relationship between anxiety and verbal working memory performance among university students based on the total time taken.

3. To identify the relationship between anxiety and visuospatial working memory performance among university students based on the total number of correct recalled.

4. To identify the relationship between anxiety and visuospatial working memory performance among university students based on the total time taken.

1.4 Research Questions

The following research study are formulated to guide this study:

1. What is the relationship between anxiety and verbal working memory performance among university students based on the total number of correct recalled?

2. What is the relationship between anxiety and verbal working memory performance among university students based on the total time taken?

3. What is the relationship between anxiety and visuospatial working memory performance among university students based on the total number of correct recalled?

4. What is the relationship between anxiety and visuospatial working memory performance among university students based on the total time taken?

1.5 Research Hypothesis

H1: There is a significant relationship between anxiety and verbal working memory performance among university students based on the total number of correct recalled.

H2: There is a significant relationship between anxiety and verbal working memory performance among university students based on the total time taken.

H3: There is a significant relationship between anxiety and visuospatial working memory performance among university students based on the total number of correct recalled.

H4: There is a significant relationship between anxiety and visuospatial working memory performance among university students based on the total time taken.

1.6 Conceptual Framework

Anxiety

Working Memory Performance
1. verbal working memory (based on the total number of correct recalled)
2. verbal working memory (based on the total time taken)
3. visuospatial working memory (based on the total number of correct recalled)
4. visuospatial working memory (based on the total time taken)
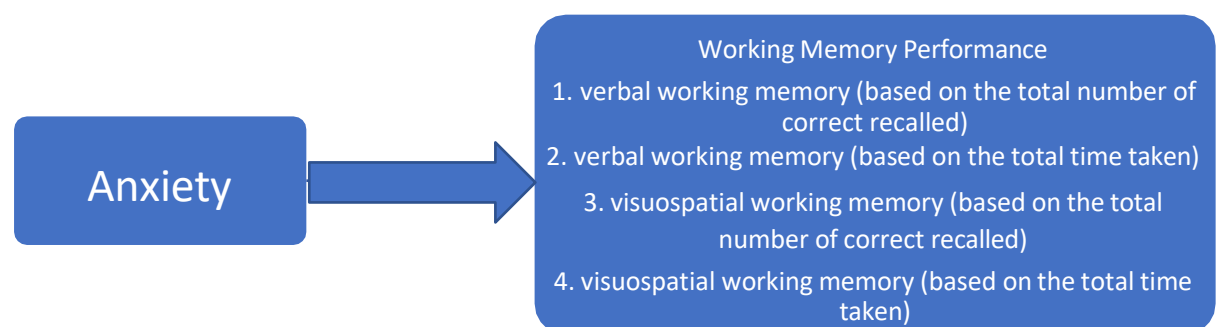
Figure 1.6 Conceptual framework

1.7 Significance of Study

Young people, especially students are vulnerable to anxiety that can affect their wellbeing in terms of emotional, behavioral, and social (World Health Organization, 2021). Numerous studies had investigated the impact of anxiety among students. However, the relationship between anxiety and students' working memory performance is still poorly understood. Therefore, this study will provide clear information on the relationship between anxiety and working memory performance. This study evaluated the score of anxiety of students in University Malaysia Sarawak through State-Trait Anxiety Inventory 6 (STAI6) questionnaires, and the performance of verbal and visuospatial working memory through two working memory span tasks. This research study is relevant to society as a whole as anxiety can be a major issue for Malaysian citizens and we still do not have clear knowledge about how anxiety can affect our working memory in everyday life.

University will be guided on what should be emphasized by lecturers in the learning syllabus to improve students' level of anxiety. The data gathered and the information evaluated will benefit students in acknowledging the effects of anxiety on the working memory which will improve their study performance and daily activities. Thus, the results and information from this study will guide students better in improving their mental health. For the researcher, the study may reveal crucial areas in the working memory capacity that many researchers have yet to explore. This current study aims to give essential information for education providers about the importance of students' psychological condition and well-being especially anxiety that has a great impact on their working memory performance. Thus, the implementation of anxiety that mainly focuses on cognition (working memory performance) is encouraged. Hence, the findings and discussion of this study may aid in quantifying the association between anxiety and working memory performance among university students as well as applying to and benefiting society and the state in general.

1.8 Definition of Terms

1.8.1 Anxiety

Conceptual Definition: American Psychological Association (2013) defined anxiety as a sensation of tension, worried thoughts, and physical effects such as elevated blood pressure. Anxiety is the multisystem reaction to a perceived threat or danger. It is the result of confluence of physiological changes in the body, the patient's personal history, memories, and social context.

Operational Definition: Anxiety in this study will be measured by using the state scale of the Spielberger State-Trait Anxiety Inventory (STAI6) that was first introduced by Spielberger (1977).

1.8.2 Verbal Working Memory

Conceptual Definition: Verbal working memory is a type of working memory that relates to how much linguistic knowledge the brain can keep and manage to accomplish a goal or solve problems. Verbal working memory is in charge of temporarily storing verbalized information such as letters, words, or recognisable objects (Van Dun & Marien, 2016).

Operational Definition: Verbal working memory can be operationally defined as the ability to remember something and perform an activity using that memory. This ability enables us to remember information so that we can use it for learning and reasoning (Kulman, 2015). Verbal working memory in this study will be measured using operation span task that was first introduced by Turner and Engle (1989). Participants will be instructed to solve a mathematical equation and remember the word that will be presented at the end of the equation. They will be asked to repeat the words that has been presented in the correct order after a series of trials (Tajik-Parvinchi,

2016). Participants can access the experiment through the link provided: https://quizizz.com/admin/quiz/6250db67641776001d2a57e0/startV4?fromBrowserLoad=true

1.8.3 Visuospatial Working Memory

Conceptual Definition: Kulman (2015) defined visuospatial working memory as manipulations of the visual information stored in humans' brains to planning, making decisions and process information. The visuospatial working memory skills include the ability to remember and recall shapes and colors, identify, and analyze space and visual form, details, spatial orientations, locations and motions.

Operational Definition: Visuospatial working memory can be operationally defined as the ability to recognize, analyze, manipulate and transform visual features and images. In this study, visuospatial working memory will be measured using rotation span task where participants are required to choose whether the two shapes displayed on the screen are mirror images or not (Wilhelm, Hildebrandt, & Oberauer, 2013).

1.9 Summary

In summary, the variables in this research study were briefly covered in the chapter. Each section in the introduction of the research has a significant role in supporting the researcher to carry out the study.

Chapter 2

Literature Review

2.0 Introduction

This chapter will discuss the variables of this study which are anxiety (independent variables) and working memory performance (dependent variables). This chapter also elaborates on the theories of anxiety and working memory in terms of verbal working memory and visuospatial working memory, past related findings correlate with the two variables, and discussion about the connection between anxiety and working memory performance.

2.1 Anxiety

The importance of anxiety as a major influenced on modern life is widely acknowledged nowadays, and representations of anxiety are universally mirrored in literature, arts, science, religion, and many other aspects of our society. Anxiety is the response of the body and mind to a stressful, dangerous, or unexpected situation. People usually have a sense of uneasiness, discomfort, or dread before some specific events (Sharma, 2021). Although anxiety helps humans to become more attentive and aware of their surroundings, however for people who suffer from an anxiety disorder, it will be utterly devastating as the person devotes time and effort to the manifestation of the symptoms, devoting less time to other aspects of everyday life, which will lead to more strain. Anxiety is a distinct sensation or emotion that differs significantly from other emotional states such as sorrow, depression, rage, or grief (Huertas, 1997; Khoshlessany Pial, 2017).